Space Weather Forecast

Issued on Friday, 21 April 2023 at 01:25 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Minor Geomagnetic Storms likely due to CME (Coronal Mass Ejection) activity, with a slight chance of Moderate or Strong Storms on 20 and 21 April. Chance of Moderate-class X-ray flares (R1-R2 Minor-Moderate radio blackouts) throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low, with the background solar activity predominantly at Common class level. There are currently six regions on the visible disc, five of which are numbered. AR3282 remains the largest and most complex region on the disc, located in the northwest quadrant. AR3283 has shown some slight increase in complexity, with the potential to develop further. The remaining groups are mostly small and simple, and appear to be either stable or in slow decay, including a new region which has recently rotated onto the visible disc No Earth-directed Coronal Mass Ejections (CMEs) have been observed in available imagery during the last 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind was initially slightly elevated, around 420 km/s, then gradually declined to end the period at background levels, around 380 km/s. The strength of the solar wind's magnetic field was at moderate levels for much of the day, then declined through the evening to become weak. The important north-south component was positive throughout. Geomagnetic activity was Quiet.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to generally be Low, with a chance of isolated Moderate activity, mainly due to the larger region in the northwest, and to a lesser extend from a smaller region in the southwest.

Solar Wind / Geomagnetic Activity: A CME may arrive at Earth today (21st Apr), possibly even tomorrow (22nd Apr). Confidence is low in the timing and impact of this feature. Otherwise, enhanced solar winds from coronal hole features may arrive and produce elevated wind speeds from late tomorrow (22 Apr), but more likely from day 3 (23rd).

Geomagnetic activity is forecast to be Quiet until the expected CME arrives. Geomagnetic activity is expected to then increase, becoming Unsettled to Active with G1/Minor Storms intervals likely, and a slight chance of G2-G3 Moderate-Strong Storm intervals. Effects will slowly decline through the following days. This is likely to give visible aurora over Scotland, with a slight chance of aurora further south across Northern Ireland, Wales and northern/central England.

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Energetic Particles / Solar Radiation: Solar radiation is currently at background levels, with just a slight chance of any increase reaching the S1/Minor Storm level or greater. This is mainly due to the risk of flaring from the larger region in the northwest of the disc.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	60	50	30	10
Strong	G3	No	10	5	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	30	30	30	30
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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